
Guest blogger Alan Trounson - April's stem cell highlights

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Since I arrived at CIRM late in 2007 I have maintained a tradition of presenting some of the top science journal papers from the previous month or two at each of our Board meetings. Beginning last month, I decided this would be easier to digest in a written document than in PowerPoint slides amid a harried board meeting. You can see an archive of these periodic stem cell reports on our website.

This month I want to start a second part of the new tradition, a brief blog note to let you know why I, as someone who toiled in stem cell labs for many years, chose these items as some of the most important papers in the field in the past month or so.

The first paper is a true breakthrough, something no one had accomplished before. A Japanese team was able to create an "organized" tissue in a dish, not just drive stem cells to become a specific adult cell, but rather two types of cells in two distinct layers. In this case they created an optic cup that resembled a post-natal retina. With one of the holy grails of stem cell research being the ability to replace complex organs, this was a brilliant paper to see.

You will see that in last month's stem cell report I discussed "this year's problem" with iPS, or reprogrammed cells, which is their much higher rate of genetic anomalies compared to embryonic stem cells (as we blogged about here). Well, this month I am discussing "last year's problems" with iPS cells. For the past couple years there has been much hand wringing about the possibility that the transcription factors used to reprogram cells, if left in the cells, could be turned on at the wrong time and lead to cancer, and that the reprogramming processes were all hugely inefficient. Now, only five years after the first iPS cells were created in mice, a number of papers came out this month showing major strides to reprogramming with only transient integration of the reprogramming factors and exponential improvement in efficiency in creating iPS cells. I have to hope that "this year's" iPS problem will be even more quickly solved or at least its relevance determined.

Last, I chose a paper that does two things: it explains a clinical result that had many purists in the fields shaking their heads in doubt and points the way to another major goal of the field, a way to stimulate endogenous stem cells to make repairs when needed. The study found a protein that can induce endogenous stem cells in heart attack patients and may explain why certain bone marrow stem cells, ones that have no ability to form heart tissue, nonetheless seem to offer some small but genuine improvement for many patients.

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